Tyco Docket No. 18060 (20958-2113)

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Remarks

Claims 1, 2, 4-18 and 22-24 were pending in the present application, from which claims 10-18 had been withdrawn from consideration. By this amendment, claims 16-18 have been cancelled and new claims 25-27 have been added. It is respectfully submitted that the pending claims define allowable subject matter. No new subject matter has been introduced by the present amendment.

With respect to the rejection of claim 23 under 35 U.S.C § 112, first paragraph, it is believed that the above claim amendments overcome this rejection by more accurately stating that the actuator element moves the extractor block toward and away from the second surface of the circuit board and that the extractor block includes the extraction pins.

The Examiner is thanked for indicating claim 24 to be allowable. Accordingly, applicants have rewritten claim 24 in independent form.

With respect to the rejection of claims 1-2, 4-9 and 22 under 35 U.S.C. § 102(e) as being anticipated by Mimata et al (USP 6,505,397), it is still believed that claim 1 and the pending dependent claims are patentably distinct from the teachings and suggestions of Mimata. Accordingly, applicants respectfully traverse the rejection based on Mimata.

The claimed tool fundamentally differs from, and is intended for a different use than, the die holding mechanism of Mimata. Due to these fundamental differences, several elements of the structure of the claimed tool differ from the structure of Mimata's die holding mechanism. For example, Mimata's die holding mechanism is not intended for insertion and removal of an electrical connector onto and from a circuit board. Instead, Mimata's mechanism operates with a wafer sheet 6 having a series of dies 1 that are pasted onto the wafer sheet 6. Each die 1 has a series of wires 2 extending upward therefrom. The wires 2 do not extend into, nor join with, the wafer sheet 6. The wafer sheet 6 does not constitute a circuit board, nor do the dies 1 constitute connectors as claimed. Hence, numerous features of the claimed tool similarly differ from the structure of Mimata's die holding mechanism. For example, Mimata's die holding mechanism

entirely lacks an extraction mechanism that is configured to remove a connector from the surface of a circuit board.

Further, the dies 1 are not connectors and the wafer sheet 6 is not a circuit board. Therefore, the wafer suction holding body 11 does not teach or suggest the claimed extraction mechanism. Among other things, claim 1 requires an actuator that comprises a plurality of extraction pins that are configured to align with and extend into the pin aperture field in the circuit board. Claim 1 further defines the extraction pins to extend into the pin aperture field from the second surface of the circuit board toward the first surface of the circuit board. The extraction pins engage pins of the connector in the pin aperture field to force the connector from the first surface of the circuit board.

In the Office Action, the wafer suction holding body 11 is maintained to constitute an extraction mechanism, yet the components of the body 11 do not have the above noted claim structure. Instead, the body 11 includes a central push-up needle 12 and peripheral push-up needles 13 that are moved by a push-up cylinder 13. As clearly shown in Figures 1C and 1B of Mimata, the needles 12 and 14 never enter the die 1, but instead abut against a surface of the die 1. The needles 12 and 14 pass through the wafer sheet 6, however the wafer sheet 6 does not constitute a circuit board. As clearly required by claim 1, the circuit board includes a pin aperture field in which the pins on the connector are inserted into the pin aperture field in the circuit board. In Mimata, the wires 2 face away from the wafer sheet 6. Claim 1 clearly defines the extraction pins as passing into the pin aperture field to engage the pins of the connector and force the connector from the circuit board. Mimata's needles 12 and 14 never contact the wires 2 and never engage pins in a pin aperture field.

Further, if the wafer sheet 6 is interpreted by the Examiner to constitute a circuit board, then Mimata entirely lacks any form of installation mechanism. Claim 1 defines the installation mechanism as being configured to insert the connector onto the first surface of the circuit board such that the pins on the connector are inserted into the pin aperture field formed through the circuit board. In the Office Action, the die holding means 20 is alleged to constitute an installation mechanism. However, the die holding means 20 never inserts anything onto the

wafer sheet 6. The die holding means 20 always remains spaced apart from the wafer sheet 6 and only operates to accept a die 1 after the needles 12 and 14 have entirely separated the die 1 from the wafer sheet 6. The die holding means 20 cannot constitute an installation mechanism if the wafer sheet 6 is interpreted to constitute a circuit board.

After Mimata is reviewed in further detail, it becomes clear that the die holding means 20 in fact operates to move the dies 1 away from the wafer sheet 6 to a different station where the dies 1 is loaded into a tray 40 (Figures 2A-2D) or onto a substrate 3 (Figures 3A-3D). The die holder 20 moves each die through a station at which a collet 41 is positioned which then moves the die 1 into a position above the substrate 3 at which the wires 2 are soldered to the surface of substrate 3 (see Figures 3C and 3D). Therefore, if the wafer sheet 6 (Figures 1A-1D) is interpreted to constitute a circuit board, Mimata entirely lacks any form of installation mechanism as Mimata provides no teaching or suggestion regarding how to install dies 1 onto the wafer sheet 6. Further, the wafer sheet 6 receives the backsides of the dies 1, not the side containing the wires 2. Alternatively, if Mimata's substrate 3 is interpreted to constitute a circuit board, then Mimata entirely lacks an extraction mechanism. The wafer suction holding body 11 does not at all interact with, nor engage, the substrates 3. Instead, the wafer suction holding body 11 operates at a first station to remove the dies 1 from the wafer sheet 6. The die holding means 20 then moves the dies 1 to a separate station at which a collet 41 locates the dies 1 on a substrate 3. Thus, when the teachings of Mimata are fully and accurately considered, it is clear that Mimata lacks the claimed tool structure.

Finally, it should be noted that to the extent that Mimata discusses soldering a die 1 to a substrate 3. Mimata entirely lacks any description of a pin aperture field that receives the pins of a connector. Instead, Mimata simply teaches soldering the wires to the surface of a substrate 3. Mimata does not provide any description of how one would subsequently remove the die 1 from the substrate 3. Also, given that Mimata teaches it desirable to solder the wires 2 to the surface of the substrate 3, it would not be practical nor desirable to add an extraction mechanism (as claimed) that engages the backside of the substrate 3 to force the wires off of the substrate. Thus, it is submitted that Mimata neither teaches nor suggests the claimed tool structure of claim 1.

In addition, it is submitted that the structure of the dependent claims is also patentably distinct over Mimata and that Mimata's teachings do not fairly anticipate the claimed structure. For example, claim 2 defines the installation mechanism and actuator to include a groove and rib combination extending toward the first surface to guide the actuator toward and away from the circuit board during installation of the connector. In Mimata, the die holding means 20 entirely lacks a groove and rib combination. Instead, Mimata provides a receding shaft 23 in a shaft hole 22A. The shaft 23 is movable upward and downward and has a soft member 25 on the lower end thereof. The are no grooves or ribs in the die holding means 20 that extend toward the surface of the die 1, nor guide an actuator toward or away from the circuit board.

Regarding claim 4, Mimata does not teach or suggest the claimed guide pin. Claim 4 clearly defines the guide pin to be positioned to extend between opposite first and second surfaces of the circuit board (e.g., through an opening in the circuit board or along the exterior edge of the circuit board). The guide pin of claim 4 secures the installation mechanism to the first surface of the circuit board. The guide pin also secures the extraction mechanism to the second surface of the circuit board. Mimata lacks any such guide pin. First, the die holding means 20 and the wafer suction holding body 11 operate entirely independent of one another with no components extending therebetween, a guide pin or otherwise. Also, the element 34A identified in the outstanding Office Action as purportedly representing a guide pin is not a guide pin. The element 34A represents a stopper that is fastened to the moveable main body 21 to regulate the closed position of the die holding levers 32A and 32B. The stoppers 34A and 34B are not positioned to extend between the opposite first and second sides of any structure, a circuit board, a die 1, a wafer sheet 6 or otherwise. Further, the stoppers 34A and 34B do not secure anything to the die 1 or wafer sheet 6. Thus, claim 4 is not anticipated by Mimata.

Regarding claim 5, Mimata's holding body 11 does not include support plates as claimed. The holding body 11 has a cylinder 13 therein with needles 12 and 14. The walls of the holding body 11 do not constitute support plates and do not anticipate the claimed structure.

Regarding claim 7, Mimata lacks an alignment member configured to position an electrical connector with respect to the pin aperture field in the circuit board. As explained

above, Figures 1A and 1B do not illustrate a circuit board. The wafer sheet 6 simply holds the backsides of the dies 1 with an adhesive. Claim 7 clearly requires the alignment member to position the connector with respect to pin aperture field in the circuit board. The wafer sheet 6 entirely lacks a pin aperture field. Nothing in the structure of Figures 1A-1D align the dies with respect to a pin aperture field since there is no pin aperture field in the components shown 1A-1D. Further, regarding the substrate 3 shown in Figures 3A-3D, Mimata also fails to describe any form of pin aperture field in the substrate 3. The substrate 3 is entirely remote from and separate from the wafer suction holding body 11. Thus, claim 11 is patentably distinct over Mimata.

Regarding claim 8, the die holding body 20 and the wafer suction holding body 11 lack modular blocks mounted on a circuit board. Claim 8 clearly defines each of the installation and extraction mechanism to comprise modular blocks mounted on and held stationary with respect to the circuit board. The structures shown in Figures 1A-1D of Mimata lacks any form of modular blocks that are held against or remote from the wafer sheet 6. Clearly no structure within the die holding means 20 is mounted on the wafer sheet 6.

Regarding claim 9, the shaft 23 in the die holding means 20 does not constitute a positioning plate that is slidably engaged with a guide tract.

Regarding new claims 25-27, it is submitted that the additional elements recited therein are also patentably distinct over Mimata. Claim 25 further defines structure of the board guide pin which secures the installation and extraction mechanisms to one another with the circuit boards supported therebetween. As explained above, in Mimata, the die holding means 20 and wafer suction holding body 11 are never secured to one another and never support a circuit board therebetween. Claim 25 further defines the installation and extraction mechanisms to prevent flexture of the circuit board while inserting and removing the connectors onto and from the circuit board. As shown in Figures 1B and 1C, Mimata clearly does not prevent flexture of the wafer sheet 6.

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Regarding claim 26, Mimata lacks installation and extraction mechanisms that simultaneously engage and support the opposite first and second surfaces of a circuit board. The die holding means 20 never engages the circuit board, in fact it never engages the wafer sheet 6 nor the substrate 3. Certainly nothing within Mimata engages both surfaces of the wafer sheet 6 simultaneously, nor does any structure in Mimata simultaneously both surfaces of the substrate 3.

Regarding claim 27, Mimata lacks guide pins that extend through guide opening in a circuit board. Mimata's wafer sheet 6 has no openings therethrough. The substrate 3 also has no opening therethrough. Claim 27 further defines securing elements threaded on guide pins to secure the installation and extraction mechanism both to the circuit board. Mimata's system never secures anything to both sides of the wafer sheet 6 or substrate 3 in connection with the installation and removal of the die 1.

In view of the foregoing, it is respectfully submitted that the pending claims define allowable subject matter. Should anything remain in order to place the present application in condition for allowance, the examiner is kindly invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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Dean Small (Reg. No. 34,730)
THE SMALL PATENT LAW GROUP LLP
611 Olive Street, Suite 1611
St. Louis, MO 63101
314-584-4081